REPORT RESUMES

ED 017 687 VT 004 406

PROFESSIONAL COMPETENCIES OF TEACHERS OF TECHNICAL EDUCATION IN FLORIDA.

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PUB DATE 67

EDRS PRICE MF-$0.50 HC-$3.12 76P.

DESCRIPTORS- *TECHNICAL EDUCATION, *TEACHER BACKGROUND, *TEACHER CHARACTERISTICS, COMPARATIVE ANALYSIS, *TEACHER EVALUATION, *TEACHER QUALIFICATIONS, JUNIOR COLLEGES, FLORIDA,

THE PURPOSE OF THIS STUDY WAS TO DETERMINE WHETHER THE PROFESSIONAL COMPETENCY OF TECHNICAL EDUCATION TEACHERS WAS A FUNCTION OF SEVERAL EDUCATIONAL BACKGROUND VARIABLES. THE SUBJECTS, 106 TECHNICAL EDUCATION TEACHERS IN THE JUNIOR COLLEGES OF FLORIDA, WERE JUDGED ON THE BASES OF A BASIC COMPREHENSIVE EXAMINATION, A SOCIOMETRIC RATING OF PROFESSIONAL COLLEAGUES, AND THE LEVEL OF COOPERATION SHOWN DURING THE STUDY. BACKGROUND VARIABLES INCLUDED (1) TYPE AND CLASSIFICATION OF COLLEGE ATTENDED, (2) ELAPSED TIME BETWEEN TEACHING CERTIFICATION AND RECEIPT OF TECHNICAL SUBJECT DEGREE, (3) GEOGRAPHIC LOCATION OF DEGREE GRANTING COLLEGE, (4) OTHER DEGREES ACQUIRED, (5) AMOUNT OF OCCUPATIONAL EXPERIENCE OTHER THAN TEACHING, AND (6) THE CLASSIFICATION OF THE OTHER OCCUPATIONAL EXPERIENCE. FINDINGS INCLUDED--(1) TEACHERS WHO HELD ACADEMIC DEGREES IN ADDITION TO THE DEGREE IN THEIR SPECIALTY AREA SCORED SIGNIFICANTLY HIGHER ON THE COMPREHENSIVE EXAMINATION, (2) HIGHER SCORES ON THE SOCIOMETRIC MEASURE WERE GENERALLY ACHIEVED BY THOSE WITH NO EXPERIENCE OTHER THAN TEACHING, (3) HIGHER COOPERATIVENESS RATINGS WERE GENERALLY ACHIEVED BY THOSE WHO RECEIVED THEIR TECHNICAL DEGREE IN THE NORTHEASTERN STATES, AND (4) THERE WERE NO SIGNIFICANT DIFFERENCES BASED ON COLLEGES ATTENDED, TIME LAPSE BETWEEN DEGREE AND CERTIFICATION, AND THE NUMBER OF YEARS EMPLOYED IN OTHER OCCUPATIONS. THE QUESTIONNAIRE, SOCIOMETRIC MEASURE, AND A BIBLIOGRAPHY ARE INCLUDED. (EM)

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Professional Competencies of Teachers of Technical Education in Florida

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PROFESSIONAL COMPETENCIES OF TEACHERS OF TECHNICAL EDUCATION IN FLORIDA

Special Grant Request
Project No. RCU 67-3

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The research reported was supported by the Division of Vocational, Technical and Adult Education, Florida State Department of Education, Tallahassee, Florida

1967

ACKNOWLEDGEMENT

Sincere appreciation is expressed for the professional assistance and support given this study by members of the Florida State Department of Education:

Dr. Carl W. Proehl, Assistant Superintendent
Vocational, Technical and Adult Education

Dr. Thomas W. Strickland, Director
Technical and Health Occupations Education

Dr. K. M. Eaddy, Coordinator
Vocational Research

and to the Deans and Directors of Technical Education and their staffs in Florida junior colleges who made this study possible.

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CHAPTER I

INTRODUCTION AND BACKGROUND

Introduction

What factors such as abilities, past experiences, personality attributes, styles of life, and the like are related to proficiency in the occupational world? To phrase the question somewhat differently, what information about an individual is associated with or will permit prediction of future competency in his career? Finding the answers to these questions has long concerned business and industrial management, education, the armed forces, and psychologists--particularly over the past several decades.

Some theorists have postulated innate abilities and/or other personality variables; others have emphasized formal training of skills, while still others reflect the point of view that the conditions of work, physical and attitudinal, determine the proficiency with which an individual performs a prescribed task or job. No doubt each theorist is partially right. If we consider the total variance in job competency, differing portions of that variance may be attributed to each of several hypothesized factors. The problem then is not one of determining the factor but rather one of determining the degree to which various factors contribute to proficiency.

Super and Crites (1962) in surveying the field of predicting vocational and educational success from measured characteristics of individuals refer to more than six hundred separate studies. Other authors, Roe (1956), Tyler (1961), R. L. Thorndike (1947) and others, report additional studies in this area. On the basis of a subjective examination and classification of the cited studies it appears that six general occupational levels or groups predominate in terms of frequency of mention. These are, in order of decreasing frequency:

1. Technical or skilled workmen
2. Sales personnel
3. Management personnel
4. Armed Forces personnel
5. Semi-skilled production workers
6. Professional workers

It is of interest to note that the professional field is less thoroughly studied, in terms of numbers of studies, than are the other major groups. Several reasons for this relative lack of attention may be hypothesized:

1. Marked criterion difficulties in defining competence or proficiency in the professions.

2. More interest among educators in professional fields, in prediction of success in training rather than success on the job.

3. Assumption that training outcomes predict professional competence.

Not only has the general area of professional practice been largely unstudied, but the area of specialization within professions has been almost completely neglected in occupational research.

There is a general need, then, to study in a systematic fashion the growing, developing professional fields and the specialties within each profession. This is especially true in professional areas in which service to individuals is the focus of the occupation. It might be argued that the importance is directly proportional to the degree of responsibility assumed by practitioners for the welfare of the clientele.

Within this framework, the study of the educational profession becomes of highest importance. Certainly no professional group can affect in a more direct manner the future of the individual and, therefore, in no professional group is the question of recognized professional attributes more important.

The educational field now recognizes a large number of specialties under its professional aegis, including special education, adult education, vocational education, and many others. Technical education, a recognized and certified specialty, is defined by Kurth (1967) as:

> ". . . a classification of occupation which often draws its content from a branch of engineering or a semi-professional field and which concerns industrial processes and methods which require knowledge and skill in the use and application of engineering and scientific principles and new or different utilization of human and material resources."

The specialty of technical education was designated as an educational property over forty years ago with the appearance of technical institutes. In the early stages of development of the field, attention was largely directed toward the semi-professional and skilled trade levels. These early efforts resulted in the development of useful techniques, based on sound physical knowledge and theory for the teaching of a vast array, and were a rationally defensible group of technologies.

The entire field of education during recent times has been characterized by several major breakthroughs and advances in the art and science of teaching. However, the increased ability to expedite teaching ability has not always represented an unmitigated benefit. Frequently, students are prepared for a job that will be extinct soon after graduation. This is a trend that would appear to continue for the future and in all likelihood will become more pronounced as technical knowledge and skill increase.

Grant Venn (1964) states that "technology has created a new relation between man and his education, and his work in which education is placed squarely between man and his work. Although this relationship has traditionally held for *some* work, modern technology has advanced to the point where the relationship may now be said to exist for all work." World War II, the Korean and Vietnam conflicts, and the ensuing epidemic need for technicians are some of the factors that created the problems of technician teaching which in turn demanded the development of teachers of technical education.

It was a reasonable extension of role for many technicians to become interested and involved in teaching technical education when the federal government passed acts to meet the technological demands that have arisen in the past two or three decades. With the passage of such acts as the Vocational Education Act of 1963, the field of technical education and the development of professional technical teachers grew up together, each contributing to the advancement of the other.

Presently there are two essential changes going on in the specialty of technical education. First, the teacher of technical education is claiming his rights and responsibilities as a professional. He no longer limits his practice to the prescription of physical agents and the supervision of technical specialties. Additionally, the technical education teacher's widening acceptance by his educational colleagues as a bona fide specialist in those areas that are concerned with "proficiency in the application of physical science principles, including the basic concepts and laws of physics and chemistry that are pertinent to the individual's field of technology." (USOE, 1962)

Many teachers of technical education in the past have felt themselves limited in their profession in the sense that they were conferred "an extensive knowledge of a field of specialization with an understanding of the engineering and scientific activities that distinguish the technology of the field." (USOE, 1962) They were further disturbed that the role of the technical education teacher might become a subordinate one, with such individuals denied the respect to be treated as a college professor or to treat their students according to their professional dictates rather than having such students be aided by teachers involved in the college transfer program or counselors, neither of whom have training in the field of technical education.

Research conducted in attempts to determine relationships between educational and other biographical factors and quality of performance has produced varied and often conflicting results. The failure to obtain consistently significant relationships is no less a function of inadequacies of identification and measurement of predictor variables than it is a consequence of difficulties in establishing criteria of occupational competency that are well defined or reliably measured. The determination of criteria of quality of performance is an old problem. Super and Crites (1962) state that:

> In most of the test validity research of the 1920's and 1930's much space is given to descriptions of the technique of test construction, the methods of securing data, the description of the criterion used, and the results of the relating of test scores to the criterion data. Not infrequently one of these topics is somewhat neglected--that in which the criterion is adequately described, too little attention is paid to its adequacy as an index of success.

This suggests to Super and Crites that researchers attempting to isolate predictor variables should reverse the traditional approach to prediction of performance. They should, perhaps, concentrate initial attention to the matter of criterion definition identification and measurement, and then later search for appropriate predictors. The cite research experiences of Jenkins (1946) and R. L. Thorndike (1947) to strengthen their proposal for a prior emphasis on criterion selection and evaluation.

In considering appropriate criterion indices, Super and Crites (1962) specify "relevance" and "reliability" as the criterion characteristics with which the researcher must be concerned. Relevance is the requirement that a criterion must adequately represent important aspects of some ultimate criterion of excellence or proficiency of performance. For example, if training outcome is the immediate criterion, the relationship of grades, test scores, or instructors' ratings should be shown to be related to some measure of excellence or proficiency in the later job. These authorities cite Jenkins' (1946) study of aerial gunnery, in which intelligence scores were found to correlate highly with grades in training, and might therefore be assumed to predict success in actual combat; but, when the curriculum was revised to make it less abstract and more practical, the correlation between intelligence and grades fell to zero.

Reliability, according to Cronbach (1960), refers to the consistency throughout a series of measurements. It is usually expressed in terms of a "reliability coefficient" which is the correlation between measurements obtained in the same manner. The reliability coefficient tells what proportion of the data variance in any instance is attributable to true individual differences, and not to sampling error.

Low criterion reliability is a function of both intrinsic and extrinsic factors. An example of the former is the inconsistency of the performance being studied. Thorndike (1947) used the illustration of navigators determining the position of their airplanes at key points in flight. By analysis of the errors, he showed that the number of such errors made in one mission had no relationship to the number of errors made in the following missions.

Extrinsic factors usually include such characteristics as variability in working conditions, lack of agreement between raters, and bias in the measurement situation. Meltzer (1944) has, for example, reported a study in which the Minnesota Rate of Manipulation Test had a correlation of -.27 with output under one management and of +.20 in the same department under a different type of management where different, more positive attitudes were engendered. Also, Jenkins (1946) mentions a study in which Naval Aviation Cadets were given successive flight checks by two experienced instructors, with correlation coefficients of approximately zero when the grades of one instructor were compared with the grades of the other.

Criteria, according to Super and Crites (1962), may be classified as proficiency measures, output records, ratings, self-ratings, administrative acts, and internal consistency measures. The first five are types of concurrent or predictive of criterion measures, the last has to do with the construction and content validity of the criterion measures.

Proficiency is usually measured by tests of information and/or skill in the performance of tasks used as indices of success. Super and Crites (1962, p.36) cite Flanagan's (1947) study which illustrates this by showing a correlation of .49 between final exam grades in ground school and final average grade for flying missions.

Output may be measured in many ways--for instance, by gross output, average earnings over a specified period of time, number of units sold by salesmen, or number of hits on a target in target practice. Mathewson's (1931) investigations of incentive systems showed that the output of industrial workers is often governed by factors other than abilities or measured motivation, and that artificial limits are often set upon the amount produced per worker per hour by fellow workers, unions, etc. These data are supported in Thorndike's (1947) study of the reliability of bombing scores in which the median reliability was +.08. However, output may be judged more subjectively by having experts evaluate results as to their quality by developing a score sheet on which specific aspects of the work are rated and the total score obtained by combining these ratings (Super and Crites, 1962, p.37).

Ratings are probably the most widely used criterion due to the relative ease with which they are obtained. The question to be kept in mind in such studies is the extent to which the ratings of one judge agree with those of another, the possible influence of halo effect, and the relevance of the traits or behavior measured to the work in question. Super and Crites (1962) again cite Thorndike (1947) who conducted a study in which airplane commanders were rated while going through combat training. The rating for "likeableness" had the highest correlation of any of the traits rated with the overall rating of suitability for combat flying. It would appear that there was considerable halo effect present but little relevance. The principal weakness in using this criterion is the neglect of important human factors not directly revealed in the product of the worker.

Self-ratings are frequently used as criterion of success in an attempt to get at the intangible and personal or subjective aspects of vocational adjustment. The focus in investigations of this type have generally been on the nature and extent of job satisfaction rather than on the predictive value of tests, although Super and Crites (1962) note that Sarbin and Anderson (1942) did study the relationship between Strong's Vocational Interest Blank and expressed satisfaction in work, and Thorndike and Hagen (1959) correlated aptitude test results of 1943 with self-rated satisfaction in 1955.

Administrative acts which provide criteria of vocational success include the obtaining of employment in a given field, promotion, increase in pay, discharge or failure, and other tangible evidence that people employed in the field consider the individual in question a success or a failure. An inherent defect in all administrative criteria is the degree to which they are affected by non-relevant external factors. For example, Hunt and Smith (1945) used ability to keep a job as a criterion, but in properous times when transfer to better jobs is more easily obtainable and when the scarcity of labor makes employers retain marginal or submarginal employees, the criterion is obviously less than adequate.

Internal consistency is used as an index of the validity of a measure although it has no *a priori* significance for criterion relevance in selecting measures of performance. The relevance of a criterion must be determined through empirical processes where possible, or at least be defensible on a rational basis.

The answer to the question, therefore, of what "causes" a person to be proficient in his chosen field depends to a significant degree upon how proficiency is defined and measured. It seems appropriate to conclude that there are proficiencies rather than a proficiency and that a number of measures must, therefore, be employed. Also, lacking evidence or even consensus as to the relevance of immediate criteria to a seemingly unlimited succession and variety of more ultimate criteria, one must arbitrarily accept or reject criterion measures as meaningful or meaningless on the basis of logical appeal or sophisticated guess. Super and Crites, while helpful in a general sense in pointing out some of the pitfalls to be avoided in criterion selection, fail to specify guides to eliminate subjective judgement in selecting criteria.

The Problem

The problem with which this study is concerned is the exploration of a number of assumptions relating to teachers in the field of technical education. That is, there are currently in the field of technical education those who contend that the proficiency with which the technical education teacher performs his function may be related to the kind of undergraduate and/or graduate education he completed, the type of school he attended, the time between completion of his training and entry into a teaching role, plus other background factors. The conviction that these factors are important is reflected in the activities of many professional boards which, in the process of admitting personnel to the elite echelons, such as the rank of Diplomat in the American Psychological Association, typically assess (subjectively) entries made on a comprehensive personal history data blank. Furthermore, there are, among specialists in these fields, some who feel strongly that levels of competence may be related to factors in the past histories of these specialists, although no previous definitive investigations have been conducted to examine these convictions.

Objectives

Six specific hypotehses have been formulated and are stated as follows (in null form):

1. There are no significant differences in the professional competency of teachers of technical education among the graduates of different types or classes of college or universities.
2. There are no significant differences in the professional competency of teachers of technical education and the length of time elapsing between the subject's first

receiving his Bachelor's degree and first application for a teaching certificate.

3. There are no significant differences in the professional competency of teachers of technical education and the geographic location in which they received their academic preparation.
4. There are no significant differences in the professional competency of teachers of technical education between those holding degrees only in their field and those holding degrees in addition to it.
5. There are no significant differences in the professional competency of teachers of technical education and the number of years that the subjects have been employed in occupations other than in technical education.
6. There are no significant differences in the professional competency of teachers of technical education and the classification of occupation held prior to the teaching of technical education.

CHAPTER II

RELATED RESEARCH

Several investigations are reported in the literature regarding the relationship of biographical data to success in occupations or in learning tasks. In some of these studies, success has been defined as academic achievement, while in others it has included both academic achievement and occupational skill development. This review of the literature will summarize and illustrate studies that have been completed with many selected groups of poeple from a variety of occupations. Studies reported will show both significant and non-significant relationships between occupational competence and biographical data.

In reviewing the reported studies on the use of non-test data as a predictor of competency in an occupational field, it was noted that much of the work had dealt with those involved in the major occupations of salesmen, clerical workers, and unskilled labor. Dunnette and Matzold (1955) noted that the basic findings of a majority of these studies (Kreidt, 1953; Wade, 1951; Dunnette, 1954) had been that personal history data would differentiate between groups on some criteria, especially job turnover. It appears that, in many instances, biographical data are a valuable predictor of competency in an occupation but, due to the lack of uniform methods of predicting from this information, it is not recognized as an applicable method to a wider range of occupations without a more comprehensive study of the relevance of specific variables for each occupation.

A substantial number of studies of the prediction of success have indicated that the application blank is a valuable predictor device in the selection of employees. Personal factors, such as age, marital status, amount of education, participation in social and professional organizations, etc., are often closely (r = .67) correlated with the length of service on the job (Tiffin, Parker and Habersat, 1947) and with the degree of effectiveness demonstrated in the performance on the job.

Most published research on application blanks has been limited in two important ways: (1) weights for the application blank items had been developed separately for different types of jobs, thus restricting the use of that technique to positions with large numbers of employees, and (2) major emphasis has been given to the selection of salesmen and clerical employees. Application of the technique to production workers, while less frequently attempted, has not been uncommon. It is noteworthy that the accuracy of prediction differs from one plant to another even if they are involved in the same occupation (Dunnette and Matzold, 1955), possibly as a function of criterion difficulties or of "shrinkage" experienced typically in cross-validation studies.

Viteles (1932) has stated that, in general, the use of application blank data has proved to be a more satisfactory method for predicting the success of salespersons than has any other technique. Kenogy and Yoakum (1925) have stated that the ideal toward which every company should direct its efforts is the development of an application blank containing all the items in it that have a definite, known significance for predicting competence in an occupation. Many researchers have tried to fulfill this task as is shown in the studies of Andrews (1929), Mosel (1952), Guthrie (1956), and Scollay (1957).

In many of these studies concerning application blanks, weights were assigned to each meaningful category. Mosel's (1952) study of the success of department store salesclerks via personal data was determined by assigning weights to the response categories for each item by the "vertical percent" method. This method weights each category according to the difference in percent of high and low selling cost employees making the response. Ohman (1941) selected thirteen items as being most meaningful and relevant. Each item of the categories was assigned a weight: the higher the weight, the more the item had been found associated with low selling-cost. Krushchner and Dunnette (1957) felt that the weighted application blank could be extended to cover broad occupational groups rather than being limited to one specific occupation.

Goldsmith (1922) applied a scale of "weighted values" to items on personal history blanks of life insurance salesman and from these data he was able to establish a critical score which eliminated 54% of those salesmen who were "incompetent" and only 16% of those who were "competent", as defined. Manson (1934) found a correlation of +.40 between production records of life insurance salesmen and an application blank score. He obtained this score by combining several weighted personal history items in such a way that there was a marked increase in the number of successful salesmen employed as the result of this application of weighted items.

Dunnette and Matzold (1955) state that the major conclusion to be drawn from these studies is that the weighted application blank has proved successful in a manner which is not highly recognized. The results of these studies show that it might be worthwhile to investigate the use of such devices for employees engaged in a variety of industrial jobs instead of limiting their use to persons employed in sales or clerical work.

Besides the method of the weighted application blank, several other devices have been used as predictors of occupational competence. Craig (1925) reported that in one store, an interest questionnaire was the only measure useful in differentiating between the more and less successful salespersons. The blank did not, however, produce the same results in a second store of a similar type. Schultz (1935) reported the use of the Strong Vocational Interest Blank in the selection of life insurance salesmen. He found that when this interest inventory was added to the already existing battery of tests, its effect was to raise somewhat the percentage of capable men selected. Other studies utilizing similar methodology include Tiffin, Parker and Habersat (1947), Stead (1937), and Soar (1956).

Kreidt (1953), in his study on the prediction of turnover among clerical workers for routine jobs, was moderately successful in using a combination of biographical data, interest questionnaires, General Ability Tests, and Clerical Speed Tests. It was determined that biographical data provided the best predictor; the other measures increased only slightly the effectiveness as estimated by the process of multiple correlation.

Apparently few attempts have been made to study relationships, if any, obtained between educational experience and competency. This is surprising since it is a frequent assumption that higher quality of performance is an outgrowth of "higher quality" of education. That is to say, graduates of certain kinds of schools or training programs reflect, in their performance, certain qualitative aspects of the institutions they attended as students or trainees. Thus one would assume greater competency from the graduates of, say, Ivy League schools, Big Ten schools, or, generally speaking, from the prestige schools.

Two studies have been widely interpreted to substantiate the hypothesis that the kind of institution attended does influence future performance. However, even a superficial analysis of the studies reveals that they do not, nor do they apparently intend to, substantiate the notion of particular kinds of institutions preparing superior scientists or scholars.

Knapp and Greenbaum (1952) posed the question, "What are the origins of scientists and scholars?" Using as a criterial the relative number of recipients of fellowships, graduate scholarships and doctoral degrees awarded during the years 1946-1951, they compared various categories of colleges and universities. They found that, generally, small liberal arts colleges were more productive in terms of the ratio of scientists and scholars attainining Ph.D. status than were other kinds of institutions. The larger, costlier schools, while producing more in terms of actual numbers, tended to send a larger percentage of graduates to the humanities rather than to the sciences, and to send relatively more directly into immediate employment rather than graduate level study.

Kanpp and Goodrich (1953), following a similar vein, assessed institutional effectiveness in producing scientists of Ph.D. level training. Institutions were rated according to academic and financial variables, entrance requirements, and qualitative evaluations of faculties and students.

Using a "productivity index" computed from the ratio of scientists produced per one thousand male baccalaureate graduates, these investigators demonstrated that relatively more scientists received their undergraduate training in institutions located in the Mid-West rural areas and significantly fewer are trained in the South. Institutions that rank highest in cost of attendance produced fewer scientists and as the student-faculty ratio increases, the production of scientists decreases.

The authors of both studies infer that there are historical and ethnic reasons for their findings, the major influence being that the spirit of openess and honest inquiry found in the highly productive institutions are direct outgrowths of a guiding liberal protestant tradition, plus the fact that the productive colleges tend to attract students who might be characterized as "upward-mobile" and perceiving the sciences as made-to-order routes for advancement of their aspirations. On the other hand, larger and more urban institutions, reflecting a materialistic ideal, tend to attract students who do not perceive a scientific career as representing a step upward on the status ladder but, instead, turn to business or the professions as a means of satisfying personal needs. The authors acknowledge that changing roles of science, industrial subsidies of training programs, etc., will tend to invalidate their findings.

The studies reviewed here do not yield an unambiguous picture of the influence of past experiences on future performance. Apparently in some settings, utilizing some criteria of performance, it is reasonable to hypothesize or assume that life-history variables "make a difference". In other settings using the same criteria or even other criteria, relationships are so diluted that prediction based on knowledge is no improvement over prediction based on chance.

CHAPTER III

METHODS AND PROCEDURES

Procedures

General Design:

The problems and issues in selection of appropriate criterion measures have been previously discussed in Chapter I. It was pointed out that the prime requisites of a criterion measure are relevance and reliability. "Relevance" of a measure pertains to the degree that an index has meaning or validity--that is, the degree to which the measure reflects the behavioral characteristics being assessed. "Reliability", on the other hand, pertains to the degree of consistency demonstrated by a measure. More specifically, the reliability of a measure indicates the stability of the index over time or the degree to which all segments of a measure are interrelated. Reliability in the second sense reflects the "internal" consistency of the measure.

Cronbach (1954), in discussing the nature of relevance and reliability, states that "... a test which is reliable may not be relevant. The question about reliability asks whether the sample of behavior taken by the test is large enough to give a dependable answer. The question about relevance asks whether the test samples the right things".

Criterion Measure 1: Basic Examination. After a student has either completed or is in his last semester of academic preparation, he is obliged to apply for certification from the state in which he wishes to teach. All teacher candidates in the State of Florida at the time this study was made were required to take either the Graduate Record Examination or the National Teacher Examination (r = .79). Both tests are comprehensive in that all important areas are sampled, and are objectively scored. Reliability of the NTE ranges from .82 to .96 for the different areas of the examination and has been found to have an average correlation of .57 with grade point averages for teachers enrolled in teacher education programs. Both of these reliability figures are well within the most stringent limits suggested for a behavioral index. It is assumed that if an individual knows more about his field than do his colleagues, his overall performance will excel theirs although it is recognized that there is not an exact correspondence between verbal knowledge and performance. Lacking exact (or even approximate) correspondence, additional measures must be utilized to insure the relevance of the criteria measurement.

Criterion Measure 2: Sociometric rating. A listing of the names of individuals in the field of technical education in the State of Florida who have been officers of state or local organizations, who have published articles in professional journals within a recent five-year period, or who have merely been members of the field will be included in a device utilized to obtain a sociometric rating of the subjects. All subjects will be asked to indicate the names on the list with which they were familiar. Use of the sociometric rating as an index of competency is justified on the assumption that the degree to which one's name is recognized by his professional colleagues is influenced by such factors as publications, research, papers presented, participation in professional affairs and leadership, all of which may be considered elements of professional competency. The internal consistency of the device was found to be .925 by the method of split halves.

Criterion Measure 3: Level of cooperation. Each subject will be rated by the investigator according to his cooperation in conducting this research. Cooperation will be defined operationally as: the amount of research data submitted by each applicant. Weights will be assigned according to the following scheme:

0 - if there was no response to the original request for data.

1 - if only a personal interview was granted.

2 - if a personal interview was granted and the sociometric device was returned.

Criterion Measure 4: Combined measure. Coefficients of correlation were compiled between each pair of the above criterion measures. If any of the two measures were significantly related it was assumed a common factor was being measured by both indices yet neither measure alone represented the factor. However, the results of the inter-correlations were as follows:

1.	the basic exam and level of cooperation	.0731
2.	the basic exam and sociometric rating device	.0078
3.	the sociometric rating device and level of cooperation	.1782

Since none of the above correlations are significant the criterion measure was omitted from the remainder of the study.

Predictor Variables:

Seven predictor variables are to be tested in this study for effectiveness in discriminating between levels of competency on the criterion measures. They are:

1. Type of college or university where the subject's course work in his technical education specialty was completed.

   a. Liberal Arts College
   b. Technical Institute
   c. Professional and Technical College
   d. Liberal Arts (generally with professional schools)

2. Classification of college or university where the subject's course work was completed.

   a. Foreign
   b. Private
   c. Public
   d. Land-grant

3. The number of years' lapse between the subject's first receiving his technical area degree and first application for teacher certification.

   a. 0 to 5 years
   b. 6 to 10 years
   c. 11 to 20 years
   d. More than 20 years

4. The geographic location of the college or university where the technical area degree was completed.

   a. In a foreign country
   b. In the Northeast
   c. In the Midwest
   d. In the Southeast (excluding Florida)
   e. In Florida
   f. Other

5. Academic degrees other than in technical education specialty held by the subject.

  a. None other
  b. Master's degree
  c. Doctoral degree
  d. Two Bachelor's
  e. Other technically related degree or certificate

6. Number of years in occupations other than technical education teacher.

  a. 0 to 5 years
  b. 6 to 10 years
  c. 11 to 20 years
  d. More than 20 years

7. Classification of occupation held prior to the teaching of technical education.

  a. None other
  b. Industry
  c. Private Business
  d. Teacher in other academic area
  e. Military

Population and Sample

The number of subjects included in this study was 106 full-time technical education teachers in the State of Florida. This number will represent the entire population of teachers of technical education in the junior colleges for the 1966-67 academic year.

Data and Instrumentation

All of the data for this study were obtained by the researcher with the cooperation of the Florida State Department of Education and the directors of technical education of the Junior Colleges in the State of Florida.

Data Analysis

Data analysic employed Analysis of Variance techniques and t tests with the .05 level being the criterion for significance.

Two types of t tests were used. In the event a non-significant F ratio between the two sample variances concerned ($F \leq \frac{S^2 \text{ largest}}{S^2 \text{ smallest}}$) is derived and indicating homogeneity between the variances,

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (M_1 - M_2)}{\sqrt{S_{2p} \left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

where $\bar{X}$ refers to the mean of the group being measured, M is a constant, S_{2p} is the pool variance and N is the number of subjects in each group. The pool variance is found by the formula:

$$S_{2p} = \frac{(N_1 - 1)\ S_1^2 + (N_2 - 1)\ S_2^2 \ldots + (N_k - 1)\ S_k^2}{\Sigma\ N_J - K}$$

where N is the number of subjects in each group, S^2 is the variance of each group, K is the total number of groups, and N_J is the total population.

However, if there is no indicated homogeneity the two sample variances concerned ($F \geq \frac{S_2 \text{ largest}}{S_2 \text{ smallest}}$), t for each pair is found by the formula:

$$t = \frac{(X_1 - X_2) - (M_1 - M_2)}{\sqrt{\frac{S_1^2}{N_1} \quad \frac{S_2^2}{N_2}}}$$

where $\bar{X}$ is the mean of the group being measured, M is a constant and S^2 is the variance of each individual sample being measured.

CHAPTER IV

RESULTS

Hypothesis 1.

To test hypothesis 1, undergraduate training institutions attended by the teachers of technical education were classified into eight categories. The first group of categories was composed of differing types of American institutions of higher education; the second category classed institutions of higher education a foreign, private, public, and land-grant. The tests for significant differences on each criterion measure were performed within each categorical group.

In the first test for significant differences in competency ratings among graduates of colleges and universities, classified as to the type of school, i.e., liberal arts, technical institute, etc., none of the obtained F ratios approached significance. The analysis of variance data are summarized in Tables 1, 2, and 3.

In the second test for significant differences in competency ratings among graduates of different classes of institutions, again none of the obtained F ratios approached significance. The analysis of variance data are summarized in Tables 4, 5, and 6.

In summary then, of six tests of the first hypothesis, all failed to yield significant F ratios and resulted in acceptance of the null nypothesis of no difference in professional compet- among teachers of technical education who graduated from different categories of undergraduate institutions.

TABLE 1

Summary of Analysis of Variance Data
Test of Differences in Mean Examination Scores of Teachers of Technical Education who Graduated from Different Types of Undergraduate Institutions

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	4156.12	3	1385.375	3.647
WITHIN	257708.5	51	3083.11	
TOTAL	261864.6	54		

$F < .05$

TABLE 2

Summary of Analysis of Variance Data
Test of Differences in Mean Sociometric Ratings of Teachers of Technical Education who Graduated from Different Types of Undergraduate Institutions

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	87.93	3	29.31	1.045
WITHIN	3092.70	101	30.62	
TOTAL	3180.63	104		

$F < .05$

TABLE 3

Summary of Anaylsis of Variance Data
Test of Differences in Mean Level of Cooperation Rating of Teachers of Technical Education who Graduated from Different Types of Undergraduate Institutions

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	.617	3	.2056	1.127
WITHIN	18.430	101	.1824	
TOTAL	19.047	104		

$F < .05$

TABLE 4

Summary of Analysis of Variance Data
Test of Differences in Mean Examination Scores of Teachers of Technical Education who Graduated from Different Classes of Undergraduate Institutions

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	10748.83	2	5374.42	1.11
WITHIN	251115.7	52	4829.15	
TOTAL	261864.6			

F<.05

TABLE 5

Summary of Analysis of Variance Data
Test of Differences in Mean Sociometric Ratings of Teachers of Technical Education who Graduated from Different Classes of Undergraduate Institutions

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	51.06	2	25.53	1.20
WITHIN	3129.56	102	30.68	
TOTAL	3180.62	104		

F <.05

TABLE 6

Summary of Analysis of Variance Data
Test of Differences in Mean Level of Cooperation Rating of Teachers of Technical Education who Graduated from Different Classes of Undergraduate Institutions

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	.0716	2	.03582	5.192
WITHIN	18.9759	102	.18604	
TOTAL	19.0475	104		

F<.05

Hypothesis 2.

To test hypothesis 2, teachers of technical education were categorized according to the length of time elapsing between the subject's first receiving his baccalaureate degree and first application for teacher certification.

Category I was composed of all teachers of technical education who had made first application for teaching certification within five years after earning their undergraduate degree; Category II consisted ot those subjects who did not apply until at least five years had elapsed but in no case more than ten years; Category III was composed of those subjects who did not apply until at least ten years had elapsed but no more than twenty years; and Category IV consisted of those subjects who had attained their baccalaureate degree more than twenty years prior to their application. The tests for significant differences were performed among the four groups on each criterion measure. The analysis of variance data is summarized in Tables 7, 8, and 9.

Since none of the obtained F ratios approached sifinficance the null hypothesis was accepted that the length of time elapsing between the subject's first receiving his baccalaureate degree and first application for teacher certification was of no consequence.

TABLE 7

Summary of Analysis of Variance Data

Test of Differences in Mean Examination Scores of Teachers of Technical Education Categorized According to the Length of Time Elapsing Between the Subject's First Receiving his Baccalaureate Degree and First Application for Teacher Certification

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	4952.92	3	1650.975	3.05
WITHIN	256911.8	51	5037.486	
TOTAL	261864.7	54		

F<.05

TABLE 8

Summary of Analysis of Variance Data

Test of Differences in Mean Sociometric Ratings of Teachers of Technical Education Categorized According to the Length of Time Elapsing Between the Subject's First Receiving his Baccalaureate Degree and First Application for Teacher Certification

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	179.99	3	59.99	2.02
WITHIN	3000.64	101	29.71	
TOTAL	3180.13	104		

F<.05

TABLE 9

Summary of Analysis of Variance Data

Test of Differences in Mean Level of Cooperation Ratings of Teachers of Technical Education Categorized According to the Length of Time Elapsing Between the Subject's First Receiving his Baccalaureate Degree and First Application for Teacher Certification

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	.72	3	.2401	1.323
WITHIN	18.33	101	.1814	
TOTAL	19.05	104		

F<.05

Hypothesis 3.

To test hypothesis 3, the geographic locations of the college or university where the technical specialty degree was completed by the teacher of technical education was classified into six categories. Category I denoted those subjects who had been grated their degree in a foreign country; Category II denoted those who had graduated from an institution in the Northeastern United States; Category III indicated graduation from a Mideastern institution; Category IV denoted those subjects who had graduated from an institution in the Southeast (excluding Florida); Category V pertained to graduates Florida colleges and universities; and Category VI was a residual category containing subjects who had graduated from other regions or areas. The tests for significant differences were performed within each categorical group.

In testing for significant differences in professional competency among the teachers of technical education who had graduated from institutions of different geographical locations, one F ratio attained significance. The significant value was attained where the criterion was the level of cooperation rating ($F = 2.5$, $P > .05$).

Since a significant value of F indicates only that variation among the array of means exceeds that expected from chance sampling effects, a series of t tests were employed to determine the sources of significance between mean variations. The means of the groups measured on the level of cooperation rating, in order of descending magnitude, are as follows:

Foreign Country = ---
Florida = 2.00
Midwest = 1.86
Northeast = 1.85
Southeast (excluding Florida) = 1.64
Other areas = 1.11

The category pertaining to foreign countries was excluded due to lack of subjects as discussed previously.

The t values for possible combinations of pairs of mean scores of the different categories are presented in Table 10:

TABLE 10

t Values for all Possible Combinations of Pairs of Mean Scores Achieved on the Level of Cooperation Rating Where the Subjects were Classified According to the Geographic Area Where the Technical Specialty Degree was Completed.

	Florida	Midwest	Northeast	Southeast	Other Areas
Florida		.054	.061	.125	.173
Midwest	.054		.017	.191	.189
Northeast	.061	.017		.152	.212
Southeast (excluding Florida)	.125	.191	.152		.031
Other Areas	.173	.189	.212	.031	

From the above matrix of t values, it is obvious that none of the possible pairs of means approaches significance and therefore indicates that they are not independent and mutually exclusive.

In summary then, of the three tests of the third hypothesis, two failed to yield significant F ratios where the criteria were the basic examination score and the sociometric rating score ($F = 1.12$, 1.12, $P < .05$ respectively) and resulted in acceptance of the null hypothesis of no difference in professional competence among teachers of technical education who had received their undergraduate degrees from institutions located in different geographical areas.

The null hypothesis was rejected where the criterion of competence was the level of cooperation rating shown on the project. Further tests failed to identify specific sources of significant difference between the mean scores of the groups measured. The analysis of the variance data is summarized in Tables 11, 12, and 13.

TABLE 11

Summary of Analysis of Variance Data

Test of Differences in Mean Examination Scores of Teachers of Technical Education Categorized According to the Geographic Location of the College or University where the Technical Area Degree was Granted

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	21648.84	4	5412.209	1.126
WITHIN	240215.8	50	4804.313	
TOTAL	261864.7	54		

$F<,05$

TABLE 12

Summary of Analysis of Variance Data

Test of Differences in Mean Sociometric Ratings of Teachers of Technical Education Categorized According to the Geographic Location of the College or University Where the Technical Area Degree was Granted

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	109.03	4	27.259	1.125
WITHIN	2071.59	100	30.715	
TOTAL	3180.62	104		

$F<.05$

TABLE 13

Summary of Analysis of Variance Data

Test of Differences in Mean Level of Cooperation Ratings of Teachers of Technical Education Categorized According to the Geographic Location of the College or University where the Technical Area Degree was Granted

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	1.738	4	.4347	2.511
WITHIN	17.308	100	.1730	
TOTAL	19.0476	104		

$F\geq.05$

Hypothesis 4.

To test hypothesis 4, teachers of technical education were classified into two broad categories. The first category was composed of those teachers whose only academic degree had been granted in their technical education specialty. Due to the small number in each category, the second group consisted of teachers who had not only attained a degree in their specialty but had also been granted other academic degrees, such as a master's degree, a doctoral degree, a second bachelor's degree or held some other technically related degree or certificate outside of their specialty field.

In testing the effects of a technical education teacher's holding a degree in addition to the one in his specialty, one significant F ratio was obtained: where the criterion is the basic examination score ($F = 3.08$, $P > .05$). When competency was measured by either the sociometric rating or the level of cooperation rating, significant F values were not obtained ($F = 1.14$, 1.30; $P < .05$, respectively). The analysis of variance data is summarized in Tables 14, 15, and 16.

The evidence from the test of this hypothesis, then, is only partially supportive of a notion that the attainment of additional degrees other than the technical education specialty degree influences the level of professional competency of teachers in technical education. It is only where competency is defined as the basic examination score that significant differences are found. Teachers holding additional degrees other than that of their technical education received a mean score of 657, while their colleagues holding only a degree in their technical education specialty had a mean score of 626. Tests between the two groups using other criterion measures do not support this notion.

TABLE 14

Summary of Analysis of Variance Data

Summary of Test of Differences in Mean Examination Scores of Teachers of Technical Education Holding Academic Degrees only in their Field and Those Holding Additional Degrees

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	51830.27	4	12957.57	3.0846
WITHIN	210034.5	50	4200.69	
TOTAL	261864.8	54		

F>.05

TABLE 15

Summary of Analysis of Variance Data

Test of Differences in Mean Sociometric Ratings of Teachers of Technical Education Holding Academic Degrees only in their Field and Those Holding Additional Degrees

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	110.209	4	27.552	1.11439
WITHIN	3070.420	100	30.704	
TOTAL	3180.629	104		

F<.05

TABLE 16

Summary of Analysis of Variance Data

Test of Differences in Mean Level of Cooperation Scores of Teachers of Technical Education Holding Academic Degrees only in their Field and Those Holding Additional Degrees

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	.9427171	4	.2356793	1.30
WITHIN	18.10490	100	.1810490	
TOTAL	19.04762	104		

F<.05

Hypothesis 5.

To test hypothesis 5, teachers of technical education were categorized according to the number of years they had spent in occupations other than as a teacher of technical education. Category II consisted of those teachers who were away from their present vocational endeavor at least six years but in no case more than ten years. Category III was composed of subjects who had been in occupations other than technical education teacher at least eleven years but never more than 20; and Category IV consisted of those subjects who had spent more than twenty years in occupations other than as a teacher of technical education.

In testing for significant differences in competency ratings among the four categorical groups of technical education teachers, no significant F ratios were obtained. The analysis of variance data is summarized in Tables 17, 18, and 19.

The evidence supports the hypothesis that there are no significant differences in the professional competency of teachers of technical education and the number of years the subjects have been employed in occupations other than in technical education.

TABLE 17

Summary of Analysis of Variance Data

Test of Differences in Mean Examination Scores of Teachers of Technical Education Categorized According to the Number of Years They Have Been Employed in Occupations Other Than That of Technical Education Teacher

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	3794.011	3	1264.4670	4.0018
WITHIN	258070.7	51	5060.209	
TOTAL	261864.7	54		

$F<.05$

TABLE 18

Summary of Analysis of Variance Data

Test of Differences in Mean Sociometric Ratings of Teachers of Technical Education Categorized According to the Number of Years They Have Been Employed in Occupations Other Than That of Technical Education Teacher

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	95.78789	3	31.929	1.050
WITHIN	3099.797	102	30.390	
TOTAL	3195.585	105		

$F<.05$

TABLE 19

Summary of Analysis of Variance Data

Test of Differences in Mean Level of Cooperation Scores of Teachers of Technical Education Categorized According to the Number of Years They Have Been Employed in Occupations Other Than That of Technical Education Teacher

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	.71403000	3	.2380100	1.320139
WITHIN	18.38975	102	.1802916	
TOTAL	19.10378	105		

$F<.05$

Hypothesis 6.

To test hypothesis 6, teachers of technical education were categorized according to the classification of occupation held prior to the position of technical education teacher. Category I consisted of those teachers who had graduated from college; Category II was composed of those subjects who had worked in industry before teaching; Category III was made up of those individuals who had been in business for themselves; Category IV consisted of teachers from other academic areas; and Category V was composed of ex-military personnel.

In testing for significant differences in competency ratings among the five categorical groups of teachers, one significant F ratio was obtained where the criterion was the sociometric rating ($F = 6.00$, $P > .05$). A non-significant value of F was found where the criteria were the basic examination score and the level of cooperation rating ($F = 1.60$, 3.34, $P < .05$ respectively). The analysis of variance data is summarized in Tables 20, 21, and 22.

T tests were again employed to locate the sources of significance between mean variations where the F test had given an indication of meaningful differences. The mean score of the sociometric rating for each category of prior occupation in order of descending magnitude is as follows:

None other = 10.40
Industry = 9.57
Private Enterprise = 9.55
Teacher in other academic area = 8.89
Military = 8.75

TABLE 20

Summary of Analysis of Variance Data

Test of Differences in Mean Examination Scores of Teachers of Technical Education and the Classification of Cooperation Prior to Their Being Teachers of Technical Education

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	29829.75	4	7457.436	1.606965
WITHIN	232034.9	50	4040.697	
TOTAL	261864.6	54		

F<.05

TABLE 21

Summary of Analysis of Variance Data

Test of Differences in Mean Sociometric Ratings of Teachers of Technical Education and the Classification of Cooperation Prior to Their Being Teachers of Technical Education

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	20.93862	4	5.234654	6.004626
WITHIN	3174.646	101	31.43214	
TOTAL	3195.585	105		

F>.05

TABLE 22

Summary of Analysis of Variance Data

Test of Differences in Mean Level of Cooperation Scores of Teachers of Technical Education and the Classification of Cooperation Prior to their being Teachers of Technical Education

	SUM OF SQ.	DEG FREEDOM	MEAN SQ.	F RATIO
BETWN	.223736	4	.05593400	3.34199
WITHIN	18.8800	101	.1869311	
TOTAL	19.10378	105		

F<.05

Since no homogeneity was indicated between the variances of the groups being measured (F = 5.03, P>.05), the t values for each possible combination of pairs of mean scores achieved on the sociometric rating of the different categories are summarized in Table 23:

TABLE 23

T Values for all Possible Combinations of Pairs of Mean Scores Achieved on the Sociometric Rating Where the Subjects were Grouped According to the Classification of Occupation Held Prior to the Position of Teacher of Technical Education

	None Other	Industry	Private Enterprise	Teacher	Military
None Other		.43	.25	.72	.78
Industry	.43		.06	.52	.66
Private Enterprise	.25	.06		.20	.25
Teacher	.72	.52	.20		.10
Military	.78	.66	.25	.10	

The matrix of t values presented above indicates that none of the possible pairs of means approaches significance and therefore are not independent and mutually exclusive.

In summary then, of the three tests of the sixth hypothesis, two failed to yield significant F ratios where the criteria were the basic examination and the level of cooperation shown on the project and resulted in acceptance of the null hypothesis of no difference in professional competence among teachers of technical education who had held different classifications of occupations prior to their present position.

This null hypothesis was rejected where the criterion of professional competence was the sociometric rating shown on the project. Further tests failed to identify specific sources of significant difference between the mean scores of the groups measured.

CHAPTER V

SUMMARY AND DISCUSSION OF FINDINGS AND CONCLUSIONS

Purpose

The purpose of this study was to determine if professional competency of teachers of technical education (as defined) was a function of a number of educational background variables. It was also the purpose of the study to provide basic data from which indices predictive of professional competency in teachers of technical education might be derived.

Description of the Sample

The subjects used in this study comprised the entire population of teachers of technical education in the State of Florida during the 1966-67 academic year. The total number of subjects involved was 106 although some were excluded from a few phases of the study because not all information was available for all subjects on the variables used in this study.

The three criterion measures of competence for each subject were: a basic comprehensive examination, a sociometric rating of professional colleagues, and the level of cooperation shown on this project. Rationales for use of these have been described above.

Educational background information of the subject included:

1. The type of college or university where the subject's course work in technical education was completed.
2. The classification of college or university where the technical area course work was completed.

3. The number of years lapse between the subject's first receiving his degree and first application for teacher certification.
4. The geographic location of the college or university where the subject's technical degree was completed.
5. Academic degrees other than in technical education specialty held by the subject.
6. The number of years spent in occupations other than as a technical education teacher.
7. The classification of occupation held prior to the teaching of technical education.

Method of Procedure

Data analysis employed the statistical techniques of analysis of variance and t test with the .05 level the criterion for significance.

Analysis of variance techniques were employed to determine the significance of obtained differences in mean criterion scores for subjects classified according to educational background factors. "T" tests were employed where a significant value of F was obtained, to classify the means of the groups into divisions alike within a group but differnt from those in other groups.

Results

The findings of this investigation are summarized as follows:

1. Where the criterion of competency was the score on the basic examination, significantly higher scores were achieved by

those teachers of technical education who held academic degrees in addition to the degree held in their specialty area.

2. Where the criterion of competency was the sociometric rating device generally higher scores were achieved by those teachers of technical education who had gone directly into teaching and had no experience in other occupations prior to their technical education teaching.
3. Where the criterion of competency was the level of cooperation shown on the project, generally higher cooperativeness ratings were achieved by those teachers of technical education who received their technical area degree in the Northeastern area of the United States.
4. There was no significant findings on any of the criteria of professional competency when the predictor variables used were:
    a. The type or class of college or university where the subject's technical area degree was granted.
    b. The length of time elapsing between the subject's first receiving his technical area degree and first application for teacher certification.
    c. The number of years that the subjects have been employed in occupations other than in technical education.

Discussion

The interpretation of the findings of this study is highly tentative and is formulated more as hypotheses to be tested by further research than as ascertained fact.

Predictor Variable 1

This investigation indicated that teachers of technical education who attended a professional college, such as M.I.T., greatly exceeded their peers who had been graduated from technical institutions on all three criterion measures. Although no significant F ratios were found between the categories of teachers measured on this variable, it is of interest to note that the graduates of professional and technical colleges and universities achieved the highest scores on all three criterion measures while those who had attended technical institutes received the lowest scores on all of the criterion measures. A summary of the mean scores is presented in Table 24.

The reasons for this large difference between the two aforementioned groups may simply be that professional and technical colleges have more rigorous admissions standards and therefore are graduating a more select group than the technical institute. Further, these professional schools typically recieve a higher level of support than their technical school counterparts. Higher levels of support permit the professional and technical colleges to offer broader curricula and experience in supporting industries and permit the teaching institution to select or include additional phases of training for their instructional value.

It may also be assumed that those institutions which have a higher level of support also have greater opportunities to introduce their students to the latest techniques and equipment and to have this material taught by full-time staff members who are actively engaged in research related to their specialty rather than by instructors who are primarily practitioners with a secondary instructional responsibility.

TABLE 24

Summary of Mean Scores of Teachers of Technical Education Classified by the Type of College Where Their Technical Area Degree was Earned for Each Criterion Measure

Category	Basic Exam	Sociometric Rating	Level of Cooperation
Liberal Arts	--	10.6	1.8
Technical Institute	630	7.0	1.7
Professional and Technical College	672	11.2	2.0
Liberal Arts with Professional School	634	9.0	1.7

Predictor Variable 2

Further differences were observed where the predictor variable was the classification of college or university where the subject's course work was completed. Perhaps most noticeable was the complete absence of foreign entries. This may be accounted for by the fact that the public junior college is a relatively new institution and does not carry with it the prestige that is so often associated with institutions of higher education located in other countries.

If is also reasonable to assume that the lack of foreign entries is due to the fact that speed and precision of communication and the ability to comprehend and formulate abstract verbal concepts are less for the individuals who must do so in a second language than for the person who is engaged in the same tasks in his native tongue. Thus, even if there were a group of foreign-educated subjects having an approximate equality of educational background with American teachers, the language problem might well cause them to score lower on the professional competency measures.

Of secondary importance was the observation that while no differences appeared between the mean scores of the groups when measured on this level of cooperation shown on the project, the graduates of privat institutions had the highest scores on both the basic examination and the sociometric rating ($\overline{X}$ = 679, 10.7, respectively). This difference may be assumed to be due to the situation elaborated upon previously whereby private schools are better endowed and are able to offer their students broader experiences. With this is usually evoked a better understanding of the field and it is possible that through this breadth of experience, they have become known to their fellow teachers. A summary of the mean scores is presented in Table 25.

TABLE 25

Summary of Mean Scores of Teachers of Technical Education Classified by the Classification of College Where Their Technical Area Degree was Earned on Each Criterion Measure

Category	Basic Exam	Sociometric Rating	Level of Cooperation
Foreign	---	---	---
Private	620	9.3	1.7
Public	679	10.7	1.7
Land-grant	637	8.7	1.8

Predictor Variable 3

Where the predictor variable was the number of years lapse between the subject's first receiving his technical area degree and first application for teacher certification, no significant differences were found among the groups measured but it is still noteworthy that those who had waited the longest period ot time achieved the greatest recognition by their peers even though this same group had the lowest basic examination scores.

This finding may be assumed to be related to the fact that older people generally are not accustomed to objective type examinations and to the possibility that younger teachers are more research-oriented and have been in more recent contact with textual material than have the older members of their profession. Older applicants may also view the examination as their last chance to obtain a specialty status; consequently, they may be threatened by the experience with a resultant anxiety. Travers (1963) has shown that anxiety in turn will have the effect of lowering recall and reducing the ability to deal effectively with symbolic or conceptual material on complex tasks.

It is quite possible that these teachers were in another aspect of their technology prior to their becoming teachers and, therefore, were previously known to the teachers of technical education. It is also noteworthy that these subjects took the basic exam at the time they applied for certification, which meant that they had been away from textual material for over 20 years. In light of this, their scores on the National Teacher Examination and Graduate Record Examination were still above average.

Interestingly enough, it was that group that had let the least time elapse between receiving their technical area degree and application for certification that achieved the lowest sociometric rating and was just a few points above the aforementioned group on the basic examination. The low sociometric rating may be due to the subject's newness in the field but it appears that the younger technical education teachers actually would be more professionally competent if they had more work experience before going into teaching to broaden the base of knowledge upon which this competency would be built. The summary of means of the groups measured is presented in Table 26.

TABLE 26

Summary of Mean Scores of Teachers of Technical Education Classified by the Number of Years Lapse Between Receiving Their Technical Area Degree and First Application for Teacher Certification on Each Criterion

Category	Basic Exam	Sociometric Rating	Level of Cooperation
0 - 5 Years	633	8.3	1.7
6 - 10 Years	665	9.8	1.8
11 - 20 Years	646	8.5	1.9
More than 20 Years	627	11.8	1.9

Predictor Variable 4

Where the predictor variable was the geographic location of the college or university where the subject's technical area degree was completed, a significant F ratio was found where the criterion of professional competency was the level of cooperation shown on this research project. This finding has been discussed previously in Chapter IV. The investigation indicated that teachers of technical education who had been graduated from institutions in the northeastern part of the United States appeared to be more competent than did their counterparts from other areas of the country.when competency was measured by the level of cooperation and basic examination score. This finding may be assumed to be due to several conditions that the teacher who completed his training in a northeaster institution experienced, which apparently had some advantages over the training received by subjects in other parts of the country. Examples of this might include: (1) greater exposure to instructors who are specialists in various areas of technical education; (2) a greater emphasis in institutions in the northeastern part of our country on specialization resulting in the development of an earlier role concept of the student as a specialist in technical education; (3) more opportunities in northeastern schools to study under a particular specialist in technical education to identify with him and to be identified by him as an individual possessing potential in a technically related specialty. The summary of means of the groups measured is presented in Table 27.

A further observation of mean scores reveals that teachers of technical education who had been graduated from Florida institutions received the lowest scores of the groups measured on the basic examination and on the level of cooperation rating as well as the next-to-lowest sociometric rating. This overall low rating of teachers of technical education who graduated from Florida schools does not necessarily mean that: (1) a lower grade of student applies to Florida schools; or (2) the training in Florida schools is below that offered in other sections of the country. What is could mean is that the area of technical education has not been adequately developed in the State. This could be shown by the fact that the only advanced technical degree granted by collegiate institutions in the State of Florida prior to 1965 was a master of industrial arts conferred by Florida State University. Therefore, it is reasonable to assume that the student in training in the Florida institution is exposed to a minimum of technical education experiences; that is, students in other parts of the country most likely receive a wide variety with regard to selection of curriculum and vocational choice. Since Florida is deficient in technical degree programs, it may also be assumed that such programs do not enjoy a high level of support and, thus, do not have the opportunity to introduce their students to the latest techniques and equipment and to have this material taught by full-time staff members who are actively engaged in technical education.

TABLE 27

Summary of Mean Scores of Teachers of Technical Education Classified by the Geographic Location of the College or University Where the Technical Area Degree was Earned on Each Criterion Measure

Category	Basic Exam	Sociometric Rating	Level of Cooperation*
Foreign Country	--	--	--
Northeast	704	9.8	2.0
Midwest	625	11.3	1.6
Southeast (excluding Florida)	627	8.3	1.9
Florida	621	8.5	1.6
Other	647	9.0	1.9

*Indicates significant F ratio found on criterion measure

Predictor Variable 5

Where the predictor variable was the existence and type of academic degrees other than that received in the technical education specialty held by the subject, a significant F ratio was found where professional competency was measured by the score received by the individual on the basic examination. Those subjects who had another technically related degree or certificate had the lowest scores on this criterion although at the same time having the highest scores on the sociometric rating. This finding may be assumed to be due to the notion that graduates of technical institutes had been identified as members under the aegis of technical education and had been in contact with many other of their fellow pupils who later became teachers of technical education. The low exam score achieved by the graduates of these technical institutes has previously been discussed under Predictor Variable No. 1. A summary of the mean scores is presented in Table 28.

The extremely low sociometric rating of that group which had achieved a doctoral degree in a field other than the technical education specialty is most likely due to the fact that there was only one member in this category, that he was located in a very remote institution, and that he had received his doctoral degree in a biological science in lieu of the technical education field (as defined) in which he was teaching.

TABLE 28

Summary of Mean Scores of Teachers of Technical Education Classified by the Academic Degrees Held Other Than in Their Technical Education Specialty on Each Criterion Measure

Category	Basic Exam*	Sociometric Rating	Level of Cooperation
None Other	626	9.2	1.8
Master's Degree	692	8.8	1.8
Doctoral Degree	746	0.0	2.0
Two Bachelor's Degrees	624	7.7	1.3
Other Technical Degree or Certificate	565	11.2	1.5

*Indicates significant F ratio found on criterion measure.

Predictor Variable 6

Where the predictor variable was the number of years the subjects had spent in occupations other than as teachers of technical education, no significant F ratios were found. Observable differences were noted, however, where the subjects who had spent less than five years outside of their present position achieved generally higher scores on the basic examinarion than did those who had spent more than five years away from the teaching of technical education. This finding may be assumed to be due to the notion that since the former group was composed of younger people or people who had spent most of their working lives as teachers of technical education, they had been able to keep current with the research in the field. A summary of the mean scores is presented in Table 29.

Surprisingly, the groups achieving the low score on this same criterion (basic examination) were those who had been in occupations other than teachers of technical education for at least six years but in no case more than ten years. At the same time, this group had the highest scores of all groups measured where the criterion measures were the sociometric rating and level of cooperation shown on this research project. These findings are most likely due to the notion that having spent a few years in the working field of the subject that they are now teaching, they are better known to more of their colleagues as well as being in a better position to realize the need for research and advancement in their field.

TABLE 29

Summary of Mean Scores of Teachers of Technical Education Classified by the Number of Years in Occupations Other Than Technical Education Teacher on Each Criterion Measure

Category	Basic Exam	Sociometric Rating	Level of Cooperation
0 - 5 Years	648	8.3	1.7
6 - 10 Years	618	10.7	1.9
11 - 20 Years	634	10.3	1.8
More than 20 Years	632	8.6	1.7

Predictor Variable 7

Where the predictor variable was the classification of occupation held prior to the teaching of technical education, one significant F ratio was found: where the criterion measure was the sociometric rating. This finding has been previously discussed in Chapter IV. In addition, it is noteworthy that the highest scores on the aforementioned criteria and the basic examination score were both achieved by the group classified as having had no occupational experience prior to that of becoming a teacher of technical education. This is probably due to the notion that this group is composed of two major types--those teachers who had recently been graduated from an advanced degree program and those who had been in the field since their graduation several years ago. A summary of the mean scores in presented in Table 30.

A further interesting finding was that the lowest basic examination scores were received by those teachers of technical education who had transferred from another teaching field. That is, in many cases teachers of mathematics and science had left the junior high and senior high level and gone on to teaching technical education at the junior college level. These low socres might be construed to be due to a sampling error rather than the fact that these teachers left their former areas due to their insecurities in these areas.

TABLE 30

Summary of Mean Scores of Teachers of Technical Education Classified by the Classification of Occupation Prior to the Teaching of Technical Education

Category	Basic Exam	Sociometric Rating*	Level of Cooperation
None Other	722	10.4	1.8
Industry	628	9.6	1.7
Private Business	688	9.6	1.8
Teacher in Other Area	617	8.9	1.8
Military	645	8.8	1.8

*Indicates significant F ratio found on criterion measure.

Conclusions

These findings do not admit to ready interpretation. There is no apparent or completely satisfying explanation for these findings either in assumption of knowledge of the dynamics of human bahavior or the nature of the variables in question. For example, close to fifty percent of those teachers of technical education at the junior college level in the State of Florida received certification via the "backdoor". That is, they received a vocational certificate in lieu of a technical certificate and thereby bypassed such requirements as submitting a score on either the Graduate Record Examination or the National Teacher Examination. Another example: why should subjects who have advanced degrees in psychology or horticulture demonstrate higher levels of interest in or identification with technical education than those who have degrees solely in their technical education specialty? One may speculate that the "level of cooperation" index measures an interest in research or scholarly effort and that subjects who do more than minimal academic work have demonstrated such interest so, therefore, respond more willingly to a research project. If this were the case, however, the level of cooperation index perhaps becomes less meaningful as a criterion measure of professional competency in teachers of technical education.

It is appropriate to advance another line of reasoning at this point. The use of the .05 level as the criterion for significance in this study specified that through chance effects alone five of every one hundred tests will result in the rejection of null hypothesis of no difference when in fact the two groups do not differ. Thus, these findings may be the result of a Type 1 error.

More realistically, it is reasonable to assume that the sample size was detrimental as a larger sample would have most likely pointed out significant differences between the groups measured on the seven predictor variables.

Since the variables here being discussed do not seemingly influence competency as measured by other indices and in view of the interpretive findings, there seems to be no compelling reason to propose that overall competency is influenced in any important way by the variables in question.

It may be concluded from this investigation that relatively few educational factors actually contribute greatly to the professional competency of teachers of technical education. Further, it may be concluded that those factors which differentiated between groups of teachers of technical education in various educational phases and levels were not entirely conclusive. Many categories of variables were omitted due to the lack of an adequate sample in that particular category, such as the lack of teachers of technical education who had taken their technical degrees at a Midwestern institution or at a foreign institution.

Further research is suggested by the author using the same predictor variables but greatly enlarging the sample. This study was done as a pilot program for future studies as well as for the information and benefit of the Florida State Department of Education and the results, in this light, are meaningful. Although it is a myopic view, one must, after reading the study, be aware of the facts that definite patterns of educational influences on professional competency are revealed and should receive further study.

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APPENDIX A

RESEARCH QUESTIONNAIRE

Name:

Date of Interview:

Location and Length of Present Employment:

Position Immediately Prior to the Present One:

Present Position Title:

College or University from Which Degree and/or Degrees were Awarded:

College	Field	Degree	Date

Date of Application for Teacher Certification:

Florida --

Other --

Occupational Positions Held Prior to the Present Position:

Field	Position	Date Entering	Date Leaving

APPENDIX B

UNIVERSITY OF FLORIDA

College of Education

Gainesville

Dear Colleague:

Recently you were contacted, either by personal interview or telephone and asked to reveal your personal background in regard to your formal educational preparation (colleges attended, etc.) and your work experiences leading up to your present position. This data has now been collected for almost all of the teachers of engineering technologies in the State of Florida.

The second and final stage of this project that will require your active participation is the completion of the enclosed sociometric device that lists the names of those educators that have been or will be contacted during the course of this study. The purpose of this device is to see if the members of this group are familiar with one another on the assumption that this familiarity would also carry over into the professional work that each of you is doing in his particular field.

If possible, I would appreciate the return of this device within two weeks after its receipt. Thank you very much for your cooperation on this project.

Sincerely yours,

Paul C. Gianini
Research Assistant
Technical Education

Please circle below those names with which you are familiar. They may be personal friends, acquaintances, authors of articles that you have read, members or officers of professional organizations to which you belong, etc. In other words, circle the names of those people of whom you have knowledge of being in the field of technical education.

Do no circle your own name.

Please allow yourself at least one-half hour for this project. Do not do it at several times but rather all in one sitting.

When you have finished, please mail the completed form back in the enclosed self-addressed stamped envelope.

Thank you.

James S. Aldrich
R. Kindred Alton
Richard C. Andreason
Emil Arameonie
John Archibald
Herbert Attaway
Leon Austin
Cloyd D. Bearup
Neal Benson
Roy F. Bergengren
Ray Bittle
Paul Blair
Horace Blakeslee
Andrew Bodor
William Bolin
Robert Book
William Bowen
H. L. Bowman

Stanley Brittingham
James Brock
William Buck
John Burke
J. Robert Carrie
Kenneth Carruth
Jack Chadurgian
K. Y. Cheng
Joseph Cipriano
Robert Claflin
Robert Conklin
Charles Connell
John Connerly
William Coleman
James Cooper
Otha Cox
Edward Crain
Norman Dando

A. H. Davidson
Henry Davison
L. N. Donnell
Ezra Ellis
Lowell Ellis
M. J. Ellis
Robert Geeslin
Wilbur Gatz
Alvin Giffin
J. Howell Goffe
David Gondry
Burt Greenstein
Lewis Griner
James Guthrie
Frank Hamlett
James Harris
Richard Harris
Leonard Hinckley

Owen Holmes
Milton Houston
Wada Howard
Frederick Howell
William Howell
J. Wyndham Ingle
Red Isert
Raymond Jacobus
Richard Jasper
Marvin Jones
William Jones
J. M. Keller
Edmondo Kelly
James Kennedy
Lawrence King
Joel Kobelin
Edward Kotchi
Raymond Lambert
John Lane
Walter Lane
Raymond LaPrade
Wayne Laurents
Arlie Lincks
Geoffrey Lynch
Don Marshall
Robert Martin
Jerome Maxwell
George Mohalis
Clifton Mack
Gordon Mondin
James Moore
Raymond Moore
Jack McAuley
David McCoach
Michael McCue
Frank McGrath
John Murphy
Hugh Norton
Charles Oliveros
Robert Only
Charles R. Parker
Robert Poh
George Polk
Buckley Rader
Fred Rankin
Margaret Rath
John Rippere
Holland Reed
Alfred Sanders
Stephon Scherer
Gerald Schickman
John Scigliano
Fred Scott
Robert Sebek
Robert Shepack
William Sigurdson
Douglas Smith
Nathanial Smith
Robert Sterling
Henry Sucoop
Robert R. Rinney
B. R. Tinsley
Wallace Travers
Leroy Vereen
Harold Walston
Jorge Warner
Alvin Weigel
Don Whitmer
George Wigfall
Frederick Williams
Lawrence Williams
John Yarnall
David Yoakley
Donald Ziebell
Thomas Zurilieh